

# Infant Mortality: Results of a Field Study in Johnstown, PA., Based on Births in One Calendar Year (1915) by Emma Duke

The book *Infant Mortality: Results of a Field Study in Johnstown, PA., Based on Births in One Calendar Year (1915)*, written by Emma Duke, detailed one of the first infant mortality field studies conducted by the US Children's Bureau. In the study, Duke and her colleagues collected information about over one thousand infants in the city of Johnstown, Pennsylvania. They used that information, along with interviews conducted with the families of the infants, to identify factors that affected infant mortality rates in the community. Duke and her team found strong correlations between elevated infant mortality rates and conditions experienced by Johnstown residents of lower socioeconomic status. The design and implementation of the study described in *Infant Mortality: Johnstown, PA* provided a model for future Children's Bureau research that resulted in seven additional infant mortality studies in other US cities. *Infant Mortality: Results of a Field Study in Johnstown, PA., Based on Births in One Calendar Year* quantitatively demonstrated the link between poverty and infant mortality.

The US Children's Bureau, headquartered in Washington, D.C., is a federal, child welfare organization that was founded under the US Department of Labor. It was established in 1912 in response to pressure from activist groups who argued that there needed to be a federal agency to investigate issues relating to children and infants, including child labor, juvenile justice, and infant and maternal mortality. In its first decade, the Children's Bureau dedicated most of its resources to projects related to understanding and reducing infant mortality, which was relatively high in the US compared to other industrialized nations. Under its first chief, Julia Lathrop, the Children's Bureau attempted to identify risk factors for high infant mortality rates with a series of field studies. The Children's Bureau also published information on prenatal and infant care, and lobbied for stricter birth registration laws and federal programs that provided services for women and infants.

*Infant Mortality: Johnstown* is a record of the field study conducted by Duke and her colleagues in the US Children's Bureau in the town of Johnstown, Pennsylvania, in 1913. Emma Duke, an agent of the Children's Bureau, wrote the text of the book and was also involved in collecting data through interviews and surveys in Johnstown. Fellow Children's Bureau colleagues Sophia Vogt and Emily Miladofsky assisted Duke with data collection in the field. Ella Merritt, statistician Ethelbert Stewart, and Children's Bureau assistant chief Lewis Meriam also worked on the design and implementation of the study.

Lathrop prefaces the book with a letter of transmission to the US Department of Labor. In the letter, Lathrop explains the motivation for the study, summarizes its results, and urges action. The majority of the book is written by Duke, who, after a brief introduction, explores how different factors including family income, national origin, sanitation, and feeding habits affect infant mortality in Johnstown. Duke shows a correlation between high infant mortality and factors strongly correlated with poverty, such as a lack of running water and low literacy rates. The report is followed by a large collection of tables showing the distribution of infant mortality for all of the conditions mentioned by Duke and three additional appendices, including a separate study on Johnstown's milk supply that the Dairy Division of the US Department of Agriculture ran during the same year. Also included after the main text are several photographs documenting specific locations within the city of Johnstown.

In the letter of transmittal, dated 24 August 1914, Lathrop presents Duke's study as the first in

a proposed series of field studies aimed at determining rates of infant mortality and factors that affect those rates in typical American cities. She briefly describes the methodology of the study and argues that the results will form a solid body of research on which later studies can build. She thanks the researchers for their contributions, including book author Duke and the others like Vogt, Miladofsky, and Stewart who collected and analyzed data. She acknowledges that the study focused solely on the impact that various social, environmental, and economic factors had on infant mortality, and did not attempt to evaluate infant mortality as a medical phenomenon.

In her letter, Lathrop stresses the strong links that the Johnstown study found between infant mortality and poor living conditions, and encourages local communities to use that information to get involved in relief efforts in their communities. Lathrop emphasizes the role of local civic action to clean up neighborhoods, pressure municipalities to repair infrastructure, and provide citizens with access to information and infant welfare services.

In the conclusion of her letter, Lathrop briefly summarizes the findings of the US Department of Agriculture study included in the appendix, describing the high levels of bacterial contamination found in most of Johnstown's milk supply. Lathrop explains why the milk study was included with the infant mortality study in the report. Although the Children's Bureau did not study the effect of poor quality milk on infant mortality directly, Lathrop argues that it is likely detrimental to infant health. She notes that the residents of Johnstown, upon hearing the conclusions of the milk study, began to mobilize for higher standards in dairy production. She also mentions that residents of Johnstown had begun to form activist groups and clubs with the intention of addressing some of the issues revealed by the infant mortality study, a response that she cites as evidence of the study's success. Lathrop argues that if the Children's Bureau identified and publicized specific conditions that elevate infant mortality in communities, those communities would be more likely to develop effective strategies to prevent infant death in their areas and demand action from local governments and councils.

Next is Duke's introduction to the book, in which she discusses infant mortality rates in the US and abroad, and describes the approach the Johnstown study took. Duke defines infant mortality as a rate relative to a year calculated by counting the number of infants per one thousand who die before reaching one year of age. She cites a figure published by the US Census Bureau that estimated the US infant mortality rate in 1911 to be around 0.124, meaning that for every thousand infants born in a single year, 124 of them died that year.

Duke criticizes that estimate for two reasons. First, she argues that without a standardized system of birth registration, large parts of the country could be left out of the calculations due to the lack of records in those regions, meaning the infant mortality rate would not accurately reflect the true nationwide rate. Second, she explains that the standard method for calculating the rate may not be fully accurate. An inventory of the number of infants who died in a calendar year versus the number of live births in the same year would fail to include deaths of infants still under twelve months old who were born late in that year but died in the next. For the Johnstown study, Duke and her colleagues recorded all infants born in 1911 and tracked them for their first full year of life, recording all deaths among them whether they occurred in 1911 or 1912.

Duke further explains in the introduction that the Children's Bureau chose Johnstown as the site for their first field study because it was a mid-size city that kept good birth records and was representative of a typical city in that region. They also had the cooperation of the state registrar, the mayor, and many local community groups who assisted them in their work, advertising the study and encouraging people to participate. In Johnstown, Duke and the Children's Bureau team completed 1551 interviews and surveys, from which they calculated an overall infant mortality rate of 135 for the city.

After the introduction, Duke describes the layout of the Johnstown area and discusses the prevalence of infant mortality in different parts of the community in a section titled "The Relation of Infant Mortality to the Environment." Duke characterizes Johnstown as an area of around five square miles crossed by many small creeks and rivers, consisting of twenty-one wards that encompass several neighborhoods. Duke found that infant mortality was variable among the different sections of Johnstown, with the largest discrepancy being between the richest and poorest areas. In Woodvale, a

neighborhood in ward eleven, the infant mortality rate was 271. According to Duke, Woodvale was one of the poorest sections of Johnstown. In the downtown area of wards one, two, three, and four, where Johnstown's wealthier citizens lived, the infant mortality rate was fifty.

In the same section, Duke identifies several possible hygiene and safety issues that could have affected health in the Johnstown area as a whole and advises that more research be done on how to mitigate them. The first problem that Duke identifies is that streams and rivers were polluted by industrial waste generated by steel mills and by sewage from nearby homes. Duke indicates that the sewage system in Johnstown was aging and in some places broken, causing waste overflow to back up and stagnate in surrounding rivers. She refers the reader to photographs of some of the contaminated rivers included at the end of the report and notes that young children often played near those rivers. Duke also mentions the prevalence of trash on the streets, which she attributes to the lack of public trash removal. Instead, residents must pay private trash collectors to remove waste. Duke advises that it was in the municipality's best interest to address issues of pollution to lower infant mortality rates, because the trash and sewage could cause disease.

In the final part of the section relating infant mortality to the environment, Duke discusses the conditions of individual homes that she and her colleagues surveyed. She notes that among homes with indoor plumbing, the infant mortality rate was 117.6. That rate increased to 197.9 in homes without indoor plumbing. Homes that researchers described as overcrowded, dirty, damp, or badly ventilated also had high infant mortality rates. However, Duke warns against identifying any one of those conditions as a cause of its own, as many of those conditions also indicate poverty and lack of other resources that could impact infant mortality.

Duke uses the subsection "Nationality" to examine infant mortality rates among women of different national origins, whether born in the US, which she calls native, or a part of Johnstown's immigrant population, which she calls foreign. Duke notes that Johnstown's native and foreign populations live in different areas from one another and rarely mix, and that foreign men were more likely to work as unskilled laborers in the mills and mines. Mortality for infants born to foreign women was 171.3, which was higher than the 104.3 for infants born to US-born women. Duke found an especially high infant mortality rate among Serbo-Croatian women, 263.9. In the article, Duke does not claim that nationality necessarily accounts for differing infant mortality rates, but she does note that foreign women were more likely to be poor and live in crowded conditions.

In the next section of the book, titled "Birth Attendants," Duke addresses infant mortality with respect to the type of assistance women received during birth. According to Duke, women who gave birth with the assistance of a physician had lower rates of infant mortality than those whose births were attended by a midwife or a relative. She mentions that, in general, native women had a physician present during delivery and foreign women used a midwife or family. Duke suggests that the difference did not reflect cultural preference as much as it did lack of access to physicians by poor foreign women. At the time, it was cheaper to hire a midwife than a doctor, and foreign women were more likely to be poor. Foreign women in higher income families often chose a physician to be present when they gave birth, and the poorest native mothers used midwives. Duke argues that well-educated and competent midwives could be an asset to the community by acting as birth attendants for poorer women. She calls for higher standards in the practice of midwifery.

In the next section titled "Mothers," Duke evaluates infant mortality in relation to various characteristics of the women she and her team interviewed, such as age and level of literacy. Infants born to women who were 40 years-old or older were more likely to die in their first year. She also found an elevated mortality rate among the infants of women who were less literate and spoke little English, something Duke attributes to poverty in communities of recent immigrants.

Under the heading "Baby's Age at Death and Cause (Disease) of Death", Duke briefly reviews the details of the infants that had died within the year, finding that over half of them died during the first three months of life from diarrhea or from respiratory diseases. She suggests that some of those deaths might have been prevented and that disease is likely made worse by poor living conditions. She cites a medical study by childhood disease researchers Luther Emmett Holt, who was an attending physician at the New York Foundling Hospital in New York City, New York, and John Howland, who worked at Columbia University College of Physicians and Surgeons in New York,

New York, in which the authors argue that high rates of infant deaths from disease in the summer months might be linked to overcrowding and deficiencies in housing.

In the section titled "Feeding" Duke analyzes how women in Johnstown fed their infants and how that affected mortality rates. Duke found that breastfeeding led to better infant health than any other feeding method, something she notes was already widely recognized by the medical community. While she acknowledges the importance of feeding choices, she criticizes previous studies that attributed variations in infant mortality too strongly to feeding choices alone. According to Duke, although breastfeeding improved mortality rates among the well-off and impoverished alike, those who lived in poverty still experienced a proportionally higher rate of infant death. She stresses the fact that breastfeeding alone could not make up for the disadvantages infants faced in the most impoverished families.

Next, under "Mother's Household Duties, Cessation and Resumption Of", Duke surveyed the extents to which the Johnstown women rested during their pregnancies and how long they waited to resume normal household activities after giving birth. She found slightly lower infant mortality rates among infants born to women who were able to take longer rest periods both before and after the birth. Once again, Duke cautions that her findings do not necessarily indicate a direct relationship between the mother's resumption of activity and infant mortality. Instead, it could reflect the fact that a wealthier woman with more resources and support could better afford to take time off.

In the section titled "Economic Factors," Duke relates her findings about infant mortality and household income. She found a strong correlation between infant mortality and the income of the father for infants born to both native and foreign women. Compared with the average mortality rate of 130.7 for the entire Johnstown sample of infants born in wedlock, infants born into families for which the father's annual income was reported as less than \$521 experienced a mortality rate of 255.7. In contrast, the rate among families that earned \$1200 or more was 84. Duke notes that to live comfortably in Johnstown, a family with two children must earn a minimum salary of \$780 a year, well above the earnings of the lowest earners surveyed. Women in those low-earning families often supplemented their husbands' incomes by renting rooms to boarders or doing domestic work. She also notes that an excess of boarders in the home could lead to conditions of overcrowding, and women who worked as domestics outside of the home might not be able to properly care for their infants or breastfeed regularly.

The remainder of Duke's report contains a series of tables that show the data collected from the interviews and surveys, photographs of the Johnstown area, and three appendices. The first appendix, titled "Statement of Mothers," is a collection of small excerpts from the interviews that Duke and her colleagues conducted with the women. According to Duke, they were included as an effort to personalize the information previously presented in numbers and tables, offering glimpses into the hardships experienced by some Johnstown families. She recounts the stories of mothers who lost multiple children in early infancy, including one whose husband claimed great shame at being married to a woman whose children all failed to survive past six weeks. The second appendix reiterates and explains in greater detail the differences between the standard method of calculating infant mortality and the method used in the Johnstown study. The third appendix is a copy of a US Department of Agriculture study on the milk supply in Johnstown.

According to historian Kriste Lindenmeyer, public interest in reducing infant mortality and community involvement in health and welfare campaigns grew after the publication of the results. Lathrop mentions in her letter of transmission that the residents of Johnstown seemed eager to begin working towards solutions to the issues revealed in the study. In the period between 1913 and 1915, the Children's Bureau conducted seven more infant mortality field studies in seven different cities, each chosen to represent a typical city in the region. Together, those studies identified problems in each city and made connections about overarching issues that contributed to infant mortality in all areas. Infant Mortality: Johnstown, PA and the rest of the city studies that followed encouraged local efforts to register births, maintain vital statistics, improve community health, and disseminate information on how to avoid preventable infant death.

## Sources

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